

MINES, MINING, LOCAL STOCKS AND COPPER

Gilman Cut and Fill Mining System Works Wonders at Junction

Novel And Efficient Method of Mining Large Sulphide Ore-bodies of the Briggs and Junction Country Little Known Outside of the Men Who Come Directly In Contact With Them in the Entire Warren District. Details Furnished

The Cut And Fill System Has Replaced The Shrinkage Stopping As It Is More Economical, More Efficient In Every Way, And Is Safer For The Men Working In The Ground Oscar Gilman, And Fred Sandtner, Work System

As proof of the assertion that the people of the Warren District do not know of important things, pertaining to the backbone of the mines of the District—the copper mines—is the following article upon the "Gilman Cut and Fill system of Mining." This system has been introduced in the Junction and Briggs shafts of the Calumet and Arizona Mining Company and presents some unique and highly instructive features to each and every reader of things pertaining to the industry. This article is from the pen of Robert H. Dickson and first appeared in the Engineering and Mining Journal. It follows:

"The Gilman cut-and-fill system is used quite extensively on the large sulphide ore bodies of the Junction and Briggs shafts of the Calumet & Arizona any slabs in the back to be easily caught up with stulls. Alternate or consecutive slabs are mined by this method. This cut-and-fill system was devised by Oscar Gilman, mine foreman, and Fred Sandtner, shift foreman, to take the place of a shrinkage-stope method, which was considered less safe under the circumstances. This system is used with various adaptations, so as to be applicable to very differently shaped ore bodies. Essentially, it consists of blocking the ore out into sections 40 ft. wide and mining each section by alternately taking 10-ft. incline cuts from the back and then filling with waste. In this way the back of the stope is never over 10 ft. above the working floor, allowing any slabs in the back to be easily caught up with stulls. Alternate or consecutive 40-ft. sections are mined, so that the width of the back that is unsupported will never exceed 40 ft. at one time.

The exact method of blocking out the ground preparatory to stoping depends on the shape of the ore body. With the larger bodies the ground is blocked out by running, from a main crosscut, parallel crosscuts at 40-ft. centers to the limits of the ore body. Vertical raises are driven off these crosscuts, near the intersections of the main crosscut or at some multiple of 50 ft. from it, usually. These crosscuts and raises serve as the first step in stoping. The raises are run up to the level above, where they hole into a crosscut and provide a means of filling the stope later on.

After crosscutting, the next step in stoping consists in shooting a little ground off the side of the crosscut so as to accommodate the temporary timbers and to make headroom enough for men to work above. These sets are placed at 5-ft. intervals along the drift. These temporary timbers are set in place merely to catch the ore that is broken in placing the regular stringer sets and thus lessen the amount of shoveling. Regular 4x10-in. lagging, 5 ft. long, which later serves as flooring, is used as temporary posts. One of the regular posts 10x10 in., 8 ft. 10 in. long, is used as a cap. The temporary sets are easily and quickly set up and taken down. When in place they will allow a 42-cu. ft. car to pass under them. Lagging, 4x100 in., is placed across the sets, except for a space 12 in. wide running lengthwise with the track, which serves as a chute mouth. This opening is covered with loose 2x10-in. plank 2 ft. long, placed crosswise over the lagging. A 2x6-in. strip is nailed lengthwise with the lagging at both ends of the row of plank, to keep them in place while blasting. As the ore is broken, it falls to the floor of the temporary set. Enough ore is shoveled off one of the short planks, so that it can be taken up, allowing the ore to fall through the opening into a car below. Then each successive short plank is removed by prying it up with a pick or bar, for the same purpose.

When sufficient ground is broken, stringer sets are placed in position above the temporary sets, which are then removed. A stringer set consists of a 10x10-in. stringer 18 ft. long, set up over two 10x10-in. posts, 5 ft. 10 in. long. A 6x10-in. block, 2 ft. long, is placed on top of posts under the stringer. To block the stringer to the next one in place 4x6-in. spreaders are used. A floor of 4x10-in. plank, 5 ft. long, is laid on top of stringers. Chutes are placed in every other set on each side of the crosscut.

Starting at the end of the stringers, the ore is then broken on both sides of the stope to make room for the incline sills. These are 10x10 stringers, 14 ft. 2 in. long, set on a little over a 20-deg. incline. A 14-in. plank floor is laid on these and serves as a slide for the broken ore to run into the chutes. It also acts as a mat between the gob (which is later introduced) and the ore below, which is mined from the lower level. As the bottom of the whole width of a 40-ft. section is timbered, mining is started with the cut-and-fill system. A raise has already been run to the level above, which is used while filling the stope. The first 10-ft. cut is taken from the back across the whole width of the section, from 30 to 40 ft. on both sides of the raise. As it is possible to drill a large number of holes, the tonnage per man is very high. A few larger boulders are broken, which must be drilled with a plugger machine and blasted. All the ore broken runs from the slides into the chutes. The back of the room, made by taking out the first slice, is usually 10 to 12 ft. above the stringers.

When the ore is all withdrawn after the first cut, waste is run in from above through the raise until it forms a cone reaching to the back of the stope. The gob pile is then evened off on the sides so as to have a triangular cross-section, instead of a cone. Sills of ordinary 2x10-in. plank are laid horizontally across both sides of this pile, and a 2-in. floor is laid on this, making two slides sloping on a 40-deg. incline from the center of the raise to the floor on the stringers. All subsequent cuts are taken off the back, parallel to these slides.

As the waste tends to get higher than the ends of the incline sills, 10x10-in. stulls, usually 12 to 15 ft. long, are stood up vertically at the ends of the inclined sills. Gob lagging is nailed to the inside of these, which serves to

(Continued on Page Two.)

HUACHUCAS ARE BOOMING AS RESULT OF MINES

Development In Every Part of Cochise County Is on Large Scale And Has Never Before Been Approximated

TUNGSTEN FINDS MADE IN NEAR-BY MOUNTAINS

Possibility Of Several Big Deals Being Made Is Strong Lead-Silver Properties Are Also Forging Ahead

A review of the mining industry in the county shows that there is continued activity in all parts. New machinery is being installed on properties in the Huachuca Mountains, Little Dragoons, Dragoons, Dos Cabezas, Bowie and the Chiricahuas. Bonds are being taken on claims and payments on options being made. Forces are being increased and the shipment of ores increased to the smelters at Douglas and El Paso, the latter smelters now being again in the market for custom ores after refusing them for the past few months.

In the Huachuca. G. J. McCabe and Bruce Dorador have just completed the installation of a sixty horse power boiler, a compressor and several sets of air drills on their properties in Montezuma canyon and are now in a position to do some extensive development work. The property they are at work upon is a lead-silver proposition and promises to develop into one of the best groups in that section of the country.

Work in Montezuma canyon on the gold properties of Wolf, Kelly, Morgan, Jones, Bauer and others is progressing. They are all doing development work on their respective claims and some of them have given options on their properties to Colorado capitalists.

The Kelly Brothers, James and Will, have begun the assessment work and development work on the new tungsten strike that they made at the entrance of Miller canyon. The ore was found in the big dyke that runs across the canyon near Kelly, Morgan, Jones, Bauer and others is progressing. They are all doing development work on their respective claims and some of them have given options on their properties to Colorado capitalists.

The eastern parties who have taken over the Old Exposed Reef property, formerly worked as a gold proposition, have a small force of men at work and are getting the property in shape for extensive development work. This property was recently sold to the eastern parties for \$250,000. The property is now being worked as a tungsten producer and indications are that it will become one of the largest producers in the country.

A small force of men are at work on the State of Texas group, recently purchased by Douglas Gray and associates from the Baron estate and others are expected to be added soon. It is the intention of the present holders to install a concentrator and other machinery on the property. It is one of the most promising silver properties that netted good returns from the shipments.

G. J. Peterson is at work on his group and is about ready to make an offer shipment to the smelters at Douglas. During the past few weeks there have been several parties on the property making an examination for eastern people with a view of taking an option. He has a number of

(Continued on Page Two.)

FIRST JURY COMPOSED OF WOMEN CONVICTS MEXICAN BANDITS



Woman's jury which convicted Mexicans in San Diego court.

Since California women have been given the ballot they have served on juries frequently, but the jury shown above is the first one to be composed entirely of women. It convicted in short order four Mexican bandits charged with highway robbery. The forewoman of this jury, Dr. Rosamond Dailey, is the gray-haired lady seated in the right foreground.

SALOME IS CENTER OF GREAT INTEREST IN MINING WORLD

Harqua Hala And Harcuvar Mountains In Western Arizona Are Attracting Great Attention From Many

SALOME, Ariz., June 17.—Investors and prospectors are pouring into the Harcuvar and Harqua Hala mountains, adjacent to Salome and Wenden. The boom, which this section has awaited so long seems fairly under way. Mining men of the east, Nevada and California are writing to inquire about this country or are coming in to see for themselves. Few come without at least opening negotiations for some of the promising prospects so plentiful in the "home of high-grade."

Among the recent visitors was E. A. Montgomery, of Skidoo and Montgomery-Shoshone fame. He came in with Didrick Rogers, of Los Angeles, who has the Minizona property, near the Harqua Hala, and left with options on several groups. A satisfactory termination of his negotiations will mean a great increase in activity around Harqua Hala. Mr. Montgomery started in the mining game as a practical prospector and has become one of the most successful operators of North America. He has been associated with such men as Charles M. Schwab and E. L. Doherty, so his approval means something.

At present he is largely interested in Mexican oil ventures.

This country is receiving attention particularly from people who are looking for properties where pay ore comes to the surface and fortunes do not have to be spent in searching for values at depth. Few districts can show such high-grade values at or near the surface. The regular series of ledges and dikes which seam the Harcuvars from the Glory Hole to Cunningham Pass, twelve miles east, are a source of constant surprise to the newcomers.

The region around Tank Pass and Cottonwood, in the Harcuvars north of Salome, has been neglected largely because of its inaccessibility. Now, however, the Cobrita Mining Company is spending several thousand dollars to build an excellent wagon road through Tank Pass. This road will be carried along a hogback to Salome, some eight miles away. It will afford easy access not only to the Cobrita, but to a number of other properties which lie through Tank Pass. New claims are being located there and work is being started on a number of old ones.

When the road is finished, which will be in about two weeks, the Cobrita will become a regular shipper. The main tunnel at the Cobrita is now in 140 feet with the face in ore that is from 35 to 45 per cent copper and carries \$55 a ton in gold. Stoping above the tunnel level has been commenced and a winze is being sunk on the ore. When the winze is down 50 feet another level will be run and the ore blocked out. A contract has just been let for the driving of the tunnel another 100 feet.

(Continued on Page Two.)

SERBIAN MINES MAY PRODUCE LARGELY

If Country Remains Under Austrian Control The Mineral Resources Will Be Brought To The Front

BEIGRADE, Serbia, June 17.—If Serbia remains under Austro-Hungarian control after the establishment of peace the Balkan state probably will take a prominent position among the world's metal producing countries, as the present conquerors of Serbia are laying plans to develop the mineral resources. In antiquity the country was the largest gold-producer in Europe. Its copper mines had, prior to the conquest of the Balkans by the Turks, developed to a considerable extent, those exploited by a French company at Bor netting annually as much as 60 per cent of the capital invested.

Gold has been won in Serbia in recent years principally through placer mining. The production was small, however, as work was confined as a rule to localities which had been already worked over by the ancients. Silver is found only in conjunction with other metals. The copper ores of Bor contain from 96 to 120 grammes per ton. The lead ores of Postenje, near Krupanj, and those of Avala on the Crveni mountain also furnish considerable silver. At Avala quicksilver is also found. Tin is found at several points, but so far no efforts have been made to develop the deposits. Arsenic exists at Jaskovka.

Copper ores occur in great quantity. Most of them resemble in character and geological deposition those of Butte, Montana. The mines at Bor, notably the one known as Cudalvan, are especially rich. Ores taken from this mine are 8 per cent copper, which refines into 96.52 per cent copper, and gives per ton 24 to 20 grammes gold, 96 to 120 grammes silver. Invested is a capital of 5,500,000 francs. In the year 1912-13 the production of ore was 7600 tons.

Iron also is found in Serbia, especially in the northeastern parts of the country. The lack of coal and coke has in the past prevented the development of the iron and steel industry, the small output of iron ores having been transported on the Danube to points in Austria-Hungary.

Before Serbia's mineral resources can be developed profitably, an extension of the country's railroad system must take place, it is pointed out. At present the ores are generally carried or carried by pack animals. Many of the best deposits can be reached by short narrow-gauge lines from the Danube, so that greater accessibility from this convenient waterway will not entail prohibitive investments.

RESUME OPERATIONS

MAYER, Ariz., June 17.—Resumption of operations at the Poochavante Copper Queen Mining company has been decided on by officers of the company, and an extensive development program adopted. Shipment of ore will be made to the mill of the Gray Eagle Reduction company, less than three miles from the Poochavante holdings. A new shaft is being sunk and the old shaft, which is over 200 feet deep, is being unwatered.

DIVIDENDS OF FIRST QUARTER FROM MINES GREATEST IN HISTORY

Year's Disbursements From Copper Producers Promise To Eclipse Those Made In Any Year Heretofore

The dividends disbursed by 35 copper mining companies in the first quarter of 1916 were approximately \$27,000,000, according to compilations made by the Financial World, which goes on to say: "Their actual earnings during the quarter aggregated \$75,291,120. This is calculated on a production of 424,856,000 pounds of copper, produced at 8 1/2 cents average cost, and sold at close to 26 cents per pound. Actual dividends paid were therefore less than half of the earnings."

"The total dividend disbursements for the year 1916 bid fair to exceed \$200,000,000 by a very substantial amount—unless some unforeseen world catastrophe dislocate this nation's domestic and export industries. "Dividends paid by the strictly copper companies in previous years, \$7,254,454 in 1915; \$41,511,489 in 1914; \$50,242,695 in 1913 (previous record year), about \$52,000,000 in 1912 and close to \$38,000,000 in 1911 and 1910. The present year will be the first time in history that the \$100,000,000 mark in yearly copper dividends will have been even nearly approached, let alone passed."

The net profits of the thirty odd dividend paying copper producers will exceed \$200,000,000 for year 1916, at the rate of earnings in the first quarter. The actual profits of the year promise to greatly surpass this sum, owing to greater production in succeeding quarters, and presumably better prices for output.

As against net profits of over \$200,000,000 from but thirty odd companies in 1916, the entire gross value of the copper production in this country in 1915 was "only" \$295,000,000. And last year itself made a record in this respect. It is difficult to grasp the full significance of this fact: that the net profits this year promise to exceed the entire gross value of the metal turned out in any year in the history of the world's copper trade.

Most assuredly the copper companies are now in the midst of the most profitable era in the history of the world's copper industry.

The fact that the total dividend disbursements for 1916 will undoubtedly be in the neighborhood of \$125,000,000 indicates that the laboring man will receive a similar increase in their pay checks. Records are being made in Arizona mining, not alone records for dividends, but records for the total amount paid out in wages, which fact is of such interest to a large number of people.

(Continued on Page Two.)

PRESCOTT IS GAINING IN MINING BOOM

County Seat Of Yavapai County Takes Advantage Of Wonderful Advance In Mining And Forges Ahead

GENERAL PROSPERITY RAMPANT IN THE CITY

Surrounding Country's Mines And Mineral Resources Bring Thousands To Mile High Community

By Wm. P. De Wolf.

PRESCOTT, Arizona, June 17.—This city, the county seat and center of general mining activity of Yavapai county, and the principal outfitting point for the mines of the county, is gaining steadily in population and commercial importance, due to the energizing and the increasing proportions of the mining industry. Mining and business men who are conversant with past and present conditions here state there has never before been a time when prosperity was so general and confidence in the future so widespread. All lines of endeavor are effected by this broadening of the mining industry and are sharers in the financial increment brought about thereby; for the basic source of wealth in Yavapai county is its mines.

Increasing demand has established a wider and more stable market for the necessities of life and as a result the farmer is selling more produce than formerly, the merchant more goods, the drover more livestock, the real estate agent more land and the broker more mines and mining shares. New businesses are being established in various portions of the city, new life is being injected into businesses of longer standing, and business blocks are being remodeled to meet the requirements of modern trade. All of the local hotels are well filled with tourists, drawn for the most part from mining and mercantile circles. Passenger and freight traffic have assumed proportions that defy heavily upon the equipment of the Santa Fe, Prescott & Phoenix Railway, and bank deposits and clearances are markedly increasing.

Will Build Smelters. New ore reduction works are being established in various sections of the county, the capacity of a number of the active plants is being increased, and several kindred projects are in the formative stage. Notable among the latter is the smelter to be erected in Prescott by English capital and the smelter to be erected in the vicinity of Jerome by the United Verde Extension Copper Company. The plant at this point will be built by the Anglo-Saxon Smelting and Refining Company, a London, England, corporation which recently filed its articles of incorporation in this State through its resident agent, George G. Lemons. The council has been petitioned to grant the company a site on the city farm for smelter purposes, and the local public to subscribe for \$50,000 worth of the company's stock. Mr. Lemons says his clients contemplate the expenditure of approximately \$1,000,000 for the establishing of the plant and that construction will start just as soon as a site has been obtained.

"Little Daisy's" Plans. The smelting plant of the United Verde Extension Company (Little Daisy), will be erected at a point convenient to the company's mine at Jerome. It is reliably reported that the YOUNG branch, situated about a mile north of Clarkdale, has been purchased for that purpose. The site in question is well adapted to the smelting needs of the company as the water supply is ample and railroad facilities are available. The ore body on the 1400-foot level of the United Verde Extension mine is of unusual proportions and value. It carries a 50-foot streak of carbonate that averages 40 per cent copper and in its entirety yields a general average of 20 per cent copper. The company employs 150 miners and is marketing an average of \$500,000 worth of ore per month at the nominal cost of approximately \$20,000.

Smelter Output. The monthly output of copper from the Clarkdale smelter, representing, save for a nominal tonnage of sludge, (Continued on Page 2)